



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/632,388	08/03/2000	Shin Hwa Li	850063.529	1164

30423 7590 05/06/2002
STMICROELECTRONICS, INC.
MAIL STATION 2346
1310 ELECTRONICS DRIVE
CARROLLTON, TX 75006

EXAMINER

MALDONADO, JULIO J

ART UNIT	PAPER NUMBER
----------	--------------

2823

DATE MAILED: 05/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/632,388

Applicant(s)

09632388

Examiner

Julio J. Maldonado

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02/26/2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6, 7, 9, 10, 20 and 22-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 7, 9, 10, 20 and 22-27 is/are rejected.
- 7) ☒ Claim(s) 2, 4, 26 and 27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: on page 4, lines 14-18, where the applicant cites, "...8k-20k angstroms...12k angstroms...15-8k angstroms...6k angstroms...1k-3k angstroms...3k-6k angstroms..." should cite "...8,000-2,000 angstroms... 12,000 angstroms... 1,500-8,000 angstroms...6,000 angstroms... 1,000-3,000 angstroms...3,000-6,000 angstroms...". On page 4, lines 26-27, where the applicant cites, "...8k-15k angstroms...13k angstroms..." should cite "...8,000-15,000 angstroms... 13,000 angstroms...". On page 5, line 3, where the applicant cites, "...2k angstroms..." should cite "...2,000 angstroms..."

Appropriate correction is required.

Claim Objections

2. Claims 2, 4, 26 and 27 are objected to because of the following informalities: in reference to claim 4 and 26, where the applicant cites, "...2k and 8k angstroms..." should cite "...2,000 and 8,000 angstroms...". In reference to claims 4 and 27, where the applicant cites "...15k angstroms...", should cite "...15,000 angstroms...".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 2823

4. Claims 4 and 27 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In reference to claim 4, the applicant claims the combined thickness of the oxide layer, the layer of undoped silicate glass, the layer of borophosphorous silicate glass, and the second layer of plasma-enhanced tetraethyl orthosilicate glass is less than approximately 15,000 angstroms, which is larger than the range disclosed on the specification, i.e. 8,000 angstroms to 15,000 angstroms.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 6 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In reference to claims 1, 6 and 20 the applicant's claim a planarized layer of plasma-enhanced tetraethyl orthosilicate over at least a portion of the layer of the borophosphorous silicate glass, and not overlying at least a portion of the borophosphorous silicate glass layer, rendering the claims indefinite since the planarized layer of plasma enhanced tetraethyl orthosilicate is deposited all over the borophosphorous silicate glass layer.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ngo et al. (U.S. 6,127,261) in view of Dawson (U.S. 5,503,882).

In reference to claims 1, 3, 6, 7, 9, 10, 20 and 22-25, Ngo et al. (Fig.1-3) teach a method to form interlayer dielectric layers including a substrate (102); a patterned oxide layer (104) disposed over the substrate (102); a layer of undoped silicate glass (112) disposed over the patterned oxide layer (104); a layer of borophosphorous silicate glass (106) over the layer of undoped silicate glass (112); and a planarized layer of plasma-enhanced tetraethyl orthosilicate (110) over at least a portion of the borophosphorous silicate glass layer (106), the layers of the undoped silicate glass layer (112), the borophosphorous silicate glass layer (106) and the planarized plasma-enhanced tetraethyl orthosilicate layer (110) together forming a pre-metal dielectric layer (column 1, line 29 – column 5, line 15).

Ngo et al. fail to teach forming a second layer of plasma-enhanced tetraethyl orthosilicate overlying the planarized layer of plasma-enhanced tetraethyl orthosilicate layer, directly overlying and being in contact with at least a portion of the borophosphorous silicate glass region having a planar surface. However, Dawson (Fig. 7b) in a related method for planarizing integrated circuit topography teaches the steps of forming a planarized layer of plasma-enhanced tetraethylorthosilicate (42); and a capping layer comprising a second layer of plasma-enhanced tetraethyl orthosilicate (52) overlying the planarized layer of plasma-enhanced tetraethyl orthosilicate layer (42). Therefore, it would have been obvious to one of ordinary skill in the art at the time

of the invention was made to form the capping layer of Dawson onto the interlayer dielectric structure of Ngo et al. and extend the capping layer in contact with the BPSG, since the capping layer provides a barrier against water sorption into layers below the capping layer (column 9, lines 4-20).

In reference to claims 2, 4, 26 and 27, Ngo et al. in combination with Dawson substantially teach all aspects of the invention but fail to show the layer of borophosphorous silicate glass having a thickness between approximately 2,000 and 8,000 angstroms and the combined thickness of the oxide layer, the layer of undoped silicate glass, the layer of borophosphorous silicate glass, and the second layer of plasma-enhanced tetraethyl orthosilicate glass is less than 15,000 angstroms. However, the selection of the claimed ranges are obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species. In re Jones, 162 USPQ 224 (CCPA 1955)(the selection of optimum ranges within prior art general conditions is obvious) and In re Boesch, 205 USPQ 215 (CCPA 1980)(discovery of optimum value of result effective variable in a known process is obvious).

Response to Arguments

9. Applicant's arguments with respect to claims 1-4, 6, 7, 9, 10, 20 and 22-27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Papers related to this application may be submitted directly to Art Unit 2823 by facsimile transmission. Papers should be faxed to Art Unit 2823 via the Art Unit 2823

Art Unit: 2823

Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2823 Fax Center number is **(703) 305-3432**. The Art Unit 2823 Fax Center is to be used only for papers related to Art Unit 2823 applications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Julio J. Maldonado** at **(703) 306-0098** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via julio.maldonado@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (703) 308-4918.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 308-0956**.

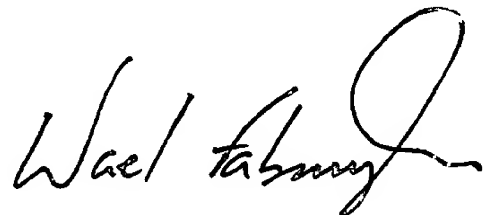
Julio J. Maldonado

Patent Examiner

Art Unit 2823

703-306-0098

julio.maldonado@uspto.gov

A handwritten signature in black ink, appearing to read 'Wael Fahmy', with a stylized flourish at the end.

SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800